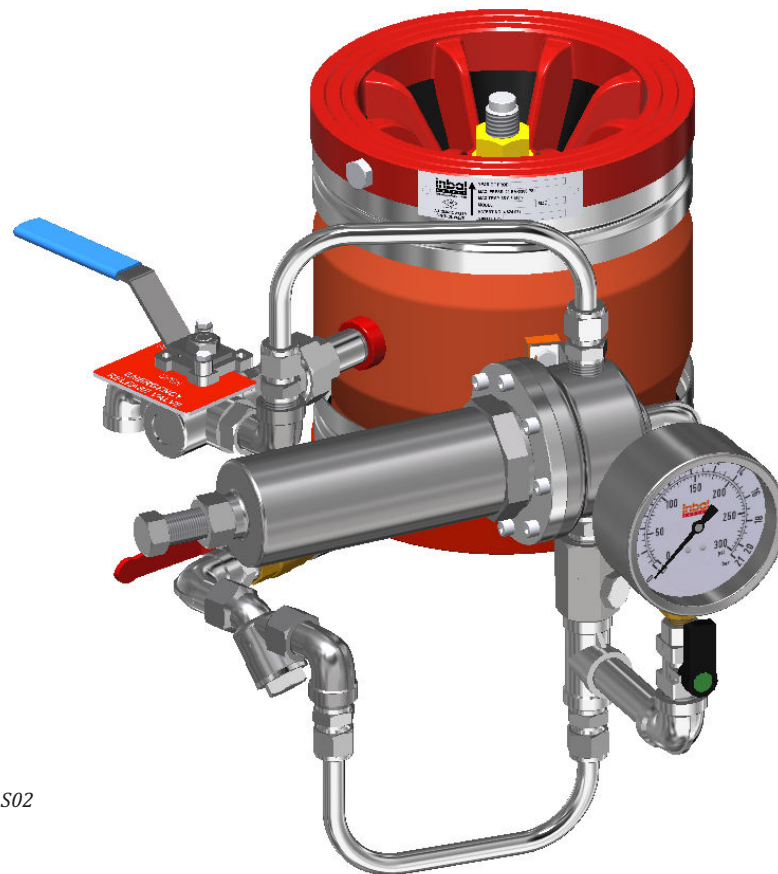


Fire Pump Pressure Relief Valve

Series 700D-01S02



Model 799D-01S02

General Description

The **Inbal** series 700D-01S02 is specifically designed for pressure relief in fire protection systems including the Fire Pump Pressure Relief Valve. The **Inbal** Fire Pump Pressure Relief Valve automatically relieves excess pressure and accurately maintains a predetermined maximum pressure, regardless of fluctuations in the upstream potential and/or changes in demand.

The series 700D-01S02 consists of the **Inbal** Valve, which is a pressure operated, sleeve actuated, axial valve, and a pressure relief pilot control. The **Inbal** Valve utilizes no moving mechanical parts, which makes the valve response to be very fast upon rapid increase in the system pressure. The instantaneous action of the **Inbal** Pressure Relief Valve virtually eliminates the development of surge conditions. On the other hand, the closure performance of the valve is gradual to prevent any secondary surge involvement in the pipeline. The pilot control enables a reliable modulating pressure relief service to maintain the system pressure accurately at a predetermined maximum constant level, protecting the system from excess pressure.

The standard material **Inbal** Fire Pump Pressure Relief Valve series 700D-01S02 is rated to a working pressure of 300 psi (21 bar), capable of withstanding severe surges caused by pump start-up or stoppage. **Inbal** Valves are available in sizes 1½" (40 mm) to 12" (300 mm), with threaded, flanged, and wafer ends.

The **Inbal** Control Valve has an excellent operating characteristic: the only moving part is the reinforced sleeve which actuates without delay due to frictionless motion. The closure of the **Inbal** Valve is achieved when the heavy-duty sleeve forms a drip-tight seal with the corrosion resistant core.

The unique design and the variety of materials and coatings make the **Inbal** Pressure Relief Valve suitable for use in brackish or sea water, similar to those found in chemical and petrochemical facilities or in offshore platforms.

Technical Data

Approvals

The basic Inbal Valve is FM Approved and UL Listed as an Automatic Water Control Valve to 300 psi (21 bar) in sizes 2" (50 mm) to 12" (300 mm).

Inbal Pressure Relief Valves have Lloyd's, ABS and DNV GL, BV, and RMRS Type Approval in sizes 1½" (40 mm) to 12" (300 mm) to working pressure of 300 psi (21 bar).

Model Numbers

Inlet End	Outlet End	Model No.
Threaded	Threaded	711D-01S02
Flanged	Flanged	733D-01S02
Wafer	Wafer	799D-01S02

Sizes

Threaded End:

1½", 2", 2½" & 3" (40, 50, 65 & 80 mm).

Flanged end:

2", 2½", 3", 4", 6", 8", 10", & 12" (50, 65, 80, 100, 150, 200, 250 & 300 mm).

Wafer End:

3", 4", 6", 8", 10" & 12" (80, 100, 150, 200, 250 & 300 mm).

End Standards

Threaded End:

NPT or BSPT.

Flanged End:

ANSI B16.5 class 150 & 300 ;

ISO 7005 - PN 10, 16 & 25 ;

BS 10 Tables D & E ;

AS 2129 Tables D & E ;

Jis B 2212, 2213, & 2214.

Wafer End:

Fits most of the above standards.

Pressure Rating

Maximum working pressure*: 300 psi (21 bar).

* Standard material valve.

Adjustment Range

Standard:

Sizes 2" to 4" (50 to 100 mm) - 45 to 190 psi (3 to 13 bar).¹

Sizes 6" to 12" (150 to 300 mm) - 45 to 270 psi (3 to 19 bar).²

Heavy:

Sizes 2" to 4" (50 to 100 mm) 130 to 270 psi (9 to 19 bar).³

(1) - Marked blue.

(2) - Marked yellow.

(3) - Marked white.

Temperature Range

Water: Max. +150°F (+65°C).

Installation Position

Vertical or horizontal.

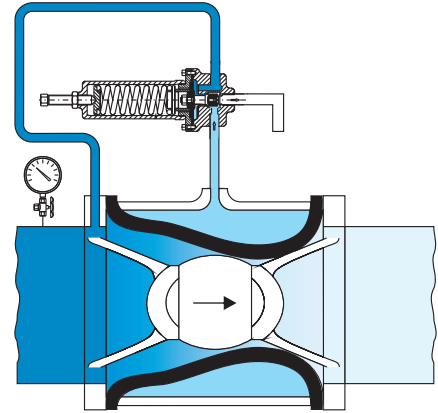


Figure (1)

"Under Satisfied" Position

The upstream pressure drops below the setting. The Pilot Valve increases the pressure at the Control Chamber.

The Inbal Valve closes to increase the upstream pressure.

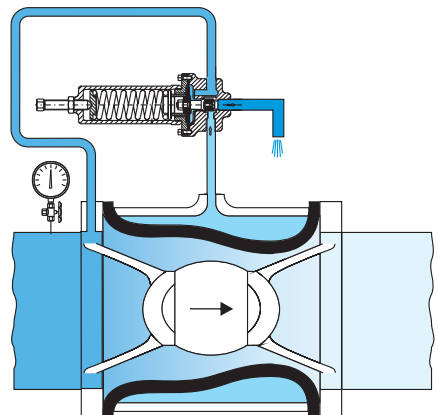


Figure (2)

"Satisfied" Position

The upstream pressure is precisely as preset. The Pilot Valve isolates the Control Chamber thus no flow goes in or out. The Inbal Valve stays in a stable throttling position.

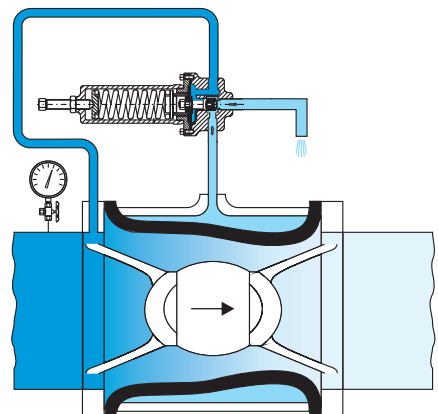
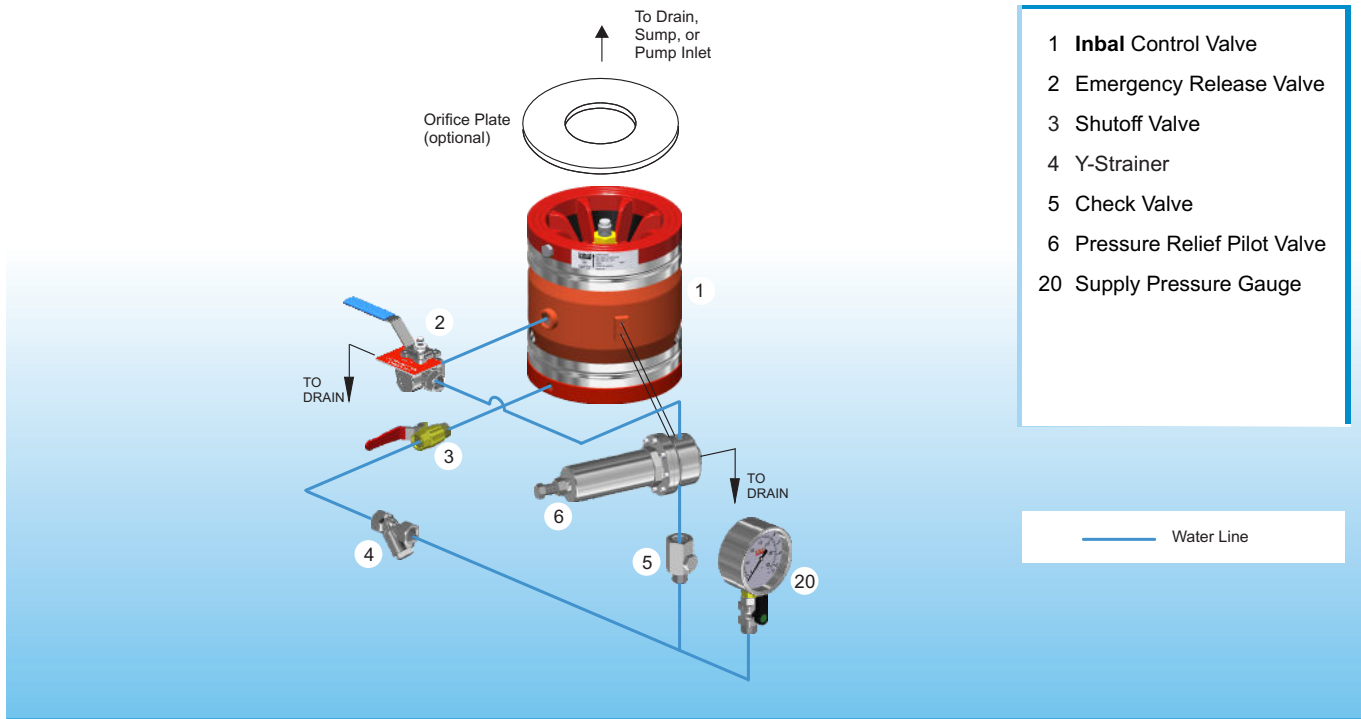


Figure (3)

"Over Satisfied" Position

The upstream pressure exceeds the setting. The Pilot Valve opens wider to decrease the Control Chamber pressure. The Inbal Valve opens further to decrease the upstream pressure.

Schematic Control Diagram – 799D-01S02



Materials

Standard

Valve Housing:

Carbon Steel (SAE 1021).

Valve Ends :

Ductile Iron (ASTM A536-65 45 12).

Sleeve:

SMR5 Elastomer reinforced with Poly-ester and Kevlar.

Control Trim:

Brass Nickel Chrome plated, Stainless Steel.

Optional

Cast Steel ;

Bronze ;

Nickel Aluminum Bronze ;

Stainless Steel AISI 316 ;

Super Austenitic Stainless Steel ;

Super Duplex Stainless Steel ;

Titanium.

Coating

Standard

Powder epoxy coated. Thickness: 0.004" (0.1 mm) external and internal surfaces.

Optional

High built epoxy coated and polyurethane finish. Thickness: 0.01" (0.3 mm).

Halar[®] coated. Thickness: 0.02" (0.5 mm).

Halar[®] is a registered trade mark of Ausimont USA Inc.

Features

- No Moving Mechanical Parts (N.M.M.P.) design provides a very fast response for effective protection of the system from surge damage.
- Accurate modulating action to maintain the system pressure within a close limit.
- Advanced design of the pilot control eliminates the need for a needle valve and provides fast removal of the **Inbal** Valve Control Chamber pressure for faster pressure relief operation.
- Easily adjustable to the desired maximum system pressure.
- Long spring design for sensitive setting and the maintaining of accurate set pressure.
- Excellent **Inbal** Valve regulating performance ensures soft, gradual closure to prevent secondary surge development.
- Hydro-dynamically designed **Inbal** Valve with streamline flow path provides increased flow capacity.
- Pressure rating of 300 psi (21 bar) for standard material valve.
- Emergency Release Valve, Strainer, Shutoff Valve, and Check Valve are standard items.
- Control trim made of high grade materials as standard.
- Epoxy coating supplied as standard ensures excellent corrosion resistance.
- Variety of available materials to ensure corrosion-free service, even under severe conditions.

Operation

The **Inbal** series 700D-01S02 Fire Pump Pressure Relief Valve is designed to be installed on a tee off the pipeline system between the fire pump and the check valve, relieving excess pressure to sump or drain system. The **Inbal** Pressure Relief Valve is installed on a by-pass at any location in the system, subject to developing surge conditions.

The Control Chamber of the **Inbal** Valve is the annular space between the valve Housing and the Sleeve. The valve is held in a closed position as long as the system pressure does not exceed the setting of the pilot valve. Should the system pressure exceed the set point, the Pilot Valve will open to vent the Control Chamber pressure, thus the **Inbal** Valve will open, relieving all excess pressure and flow to sump or atmosphere [see Figure (3)]. As pipe line pressure drops, the Pilot Valve and the **Inbal** Valve start to close gradually while monitoring that the system pressure does not exceed the preset pressure at any time [see Figure (1)]. Once the system pressure exceeds the set point, during the closure process, the **Inbal** Valve starts to regulate and accurately maintains the preset system pressure [see Figure (2)]. When the fire system demand ceases, the **Inbal** Fire Pump Pressure Relief Valve opens to relieve all of the pump pressure and flow. The check valve then closes, isolating the fire system. The pump may now safely be stopped without generating any system surges. When the pump is idle, the **Inbal** series 700D-01S02 Valve slowly closes, automatically resetting for the next cycle.

The Emergency Release Valve enables overriding of the pilot control to open the **Inbal** Valve when the fire pump operates but irrespective of line pressure exceeding the set point.

Control Trim

The control trim includes all the components, nipples, fittings, and tubing. On standard the control trim supplied preassembled in sections. The 700D-01S02 is supplied after passing comprehensive hydraulic tests and being set, on standard (unless otherwise required), to 150 psi (10 bar). The control trim includes the following components:

- Pressure Relief Pilot Valve.
- Shutoff Valve.
- Strainer.
- Check Valve
- Emergency Release Valve.
- Supply Pressure Gauge and Pressure Gauge Valve.

Valve Sizing

To extend the life span of the **Inbal** Pressure Relief Valve, it is recommended to calculate cavitation conditions at the given pressures and flow rates. Refer to **Inbal** Valve Sizing bulletin F50-01.

Capacity Chart

Inbal Valve Size	Maximum Recommended Flow Rate NFPA 20	Maximum Intermittent Flow Rate
(Inch)	(gpm)	(gpm)
1½"	100	200
2"	250	310
2½"	300	530
3"	500	700
4"	1000	1250
6"	2500	2800
8"	5000	5000
10"	-----	7700
12"	-----	11 200
(mm)	(m³ / h)	(m³ / h)
40	23	45
50	57	70
65	68	120
80	114	160
100	227	285
150	568	640
200	1135	1135
250	-----	1750
300	-----	2550

Installation

Refer to the Trim Chart applicable to the **Inbal** Pressure Relief Valve model in use. The valve must be installed in an area not subject to freezing temperatures or physical damage. The **Inbal** Valve series 700D-01S02 can be installed horizontally or vertically.

1. When the **Inbal** Pressure Relief Valve is delivered, carefully unpack and check that there has been no damage to the operating components, piping, and fittings.
2. Always flush the pipeline before installing the **Inbal** Valve.
3. Place the **Inbal** Valve in the piping at the outlet of the tee. Verify that the arrow on the **Inbal** Pressure Relief Valve matches the actual flow direction. Determine from which side the system will be accessed, and locate the **Inbal** Valve on the piping system accordingly.

Fire Pump Pressure Relief Valve



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4. Install the **Inbal** Pressure Relief Valve in the pipeline. Use tape, gaskets, bolts, stud bolts, bolt sleeves, and nuts as required by the specific **Inbal** Valve model in use.
5. Complete the trim assembly by mounting the preassembled sections. Refer to the applicable Trim Chart and Instructions
6. Connect the drain port of the Pressure Relief Pilot Valve to the drainage system.
7. Open the shutoff valve. To ensure smooth operation, all air must be expelled from the **Inbal** Valve Control Chamber and pilot control system.
8. If adjustment is required see (3) in Resetting
9. Test the **Inbal** Pressure Relief Valve according to the Testing procedure.

Resetting

1. During normal course of operation, the **Inbal** Pressure Relief Valve is automatically reset after operation.
2. If the **Inbal** Valve was actuated by the Emergency Release Valve, the handle of the valve should be returned to SET position.
3. If the relieved set point pressure is to be adjusted, turn the Pilot Valve adjusting screw clockwise to increase and counter-clockwise to reduce the pressure setting.

Maintenance, Inspection, & Testing

It is recommended that periodic inspections and tests be conducted by qualified personnel to ensure that the **Inbal** Pressure Relief Valve is in good operating condition. The inspection and testing activities should be done according to NFPA standards, the guidelines and regulations of the authorities having jurisdiction, and the following instructions. It is recommended that the **Inbal** Pressure Relief Valve be tested, operated, cleaned, and inspected on a routine basis.

Inspection

A *monthly* inspection is recommended:

1. Check the Supply Pressure Gauge reading.
2. Verify that the Shutoff Valve is in OPEN position.
3. Verify that the Emergency Release Valve is in SET position.
4. Verify that the Pilot Valve and the **Inbal** Valve are tightly closed.
5. Visually inspect for broken or missing parts, or other evidence of impaired protection.

Strainer Cleaning

A *quarterly* strainer cleaning is recommended:

1. Close the Shutoff Valve.
2. Remove the cover of the strainer, clean if necessary. Reinstall the screen and the cover.
3. Open the Shutoff Valve.

Pressure Relief Valve Testing

A *semi-annual* Pressure Relief Valve Testing is recommended:

1. The testing of the valve involves the operation of the Fire Pump. If testing of the entire system is not feasible, then the Main Shutoff Valve should be closed before the pump is activated. The **Inbal** Pressure Relief Valve is sized to have the capability of relieving the full pump capacity at the predetermined system pressure.
2. When the pump is on, verify that the Pilot Valve and the **Inbal** Valve are open and that the pump delivery pressure is maintained at the preset level.
3. When the pump is stopped verify that both the Pilot Valve and the **Inbal** Valve gradually close to a drip tight position.

Pilot Valve Testing

Operation of the **Inbal** Pilot Valve should be done *quarterly*. If operation of the entire system is not feasible, then an individual pilot testing should be performed.

Testing of the Pilot Valve should be done by following the instructions in bulletin F36-05 - "Pressure Relief Pilot Valve models PN2 & PO2".

Removal

To remove the **Inbal** Pressure Relief Valve:

1. Close the Main Shutoff Valve.
2. Open the Emergency Release Valve to release the water pressure from the **Inbal** Valve Control Chamber.
3. Remove the **Inbal** Pressure Relief Valve from the line for inspection.
4. To reinstall, follow the installation procedure (use new gaskets for flanged or wafer valve).

Inquiries/Orders

The Data Sheet for Inquiries/Orders (bulletin F01-05) should be submitted. ●